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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/496,506 | 02/02/2000 | Munir H. Nayfeh | 1201.63407 | 6344 |

24978 7590 11/04/2003

GREER, BURNS & CRAIN
300 S WACKER DR
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CHICAGO, IL 60606

EXAMINER

CRANE, SARA W

| ART UNIT | PAPER NUMBER |
|----------|--------------|
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2811

DATE MAILED: 11/04/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/496,506

Applicant(s)

NAYFEH ET AL.

Examiner

Sara W. Crane

Art Unit

2811

-- The MAILING DATE of this communication appears on the cover sheet with the corresponding address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 August 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 2 and 4-8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 4-8 is/are rejected.
- 7) ☒ Claim(s) 2 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

Claims 5-7 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

See reasons of record in the Office action of 6 May 2003. As noted there, single particle tunneling as explicitly set forth in claims 5-7 has not been shown, and would require undue experimentation to produce.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1, 4, 5, and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al. in view of Forbes and Pankove et al.

See the Office action of 5 November 2002, which notes that Forbes, in particular, teaches each element of for example claim 1.

Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over the references as applied to claims 1, 4, 5, and 8 above, and further in view of Matsumura et al.

Application of light to move carriers between a quantum box and a channel is motivated by Matsumura et al., as noted in the Office action of 4 October 2001.

Claim 2 would be allowable if expressed in completed form, including all of the limitations of claim 1. Applicant is urged to present claims drawn to the embodiment of figure 1, where the single particle tunneling is associated with irradiation of light, as disclosed.

Conclusion

Applicant argues with respect to the 112, first paragraph, rejection that the specification contains figures which sketch the various elements of the rejected claims. As noted previously, however, Applicant has not shown that single particle tunneling can be obtained by the method of these claims. Sketches are not experimental results. Whether this phenomenon can be obtained in a particular experimental setup is not predictable in nature, and undue experimentation would be required to generalize the results of Applicant's figure 1 to produce a transistor having the regions recited in the claims. Have any experimental results been obtained, to show that the method would work? This is a particular problem with claims 6 and 7, which require hole creation by irradiation. Has this result been accomplished, or merely predicted? Applicant argues that "a source" and "a drain" could be movable. Applicant's specification does not appear to use this terms in this sense, and one of ordinary skill would not understand "source" or "drain" to refer to electrodes such as those of figure 1. The terms refer to transistor regions. Transistors are three terminal devices, where one of the terminals

(the gate) controls current flow between two other terminals. No transistor action is shown in any of the experimental results reported with respect to figures 2-5. No hole creation by irradiation is shown for the device of figure 6.

Applicant argues with respect to the Forbes reference that this teaching discloses particles having a diameter ranging from 10A to 100A. The reference teaches a process which produces uniform sized particles. A uniform size of 10A, for example, is obtained by "a particular set of processing conditions" (column 4, lines 60-67). A uniform size of 100A is obtained by *another* set of processing conditions. Nothing in claim 1, for example, requires a spherical particle. A needle-shaped nanoparticle would meet the claim requirements, because the claim recites only that the particles must have "a" diameter. Note, however, that the particles in the Forbes figures are round. The Forbes reference also teaches a method by which the particles can be made, and there appears to be no reason why this method would not work as desired by the reference.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

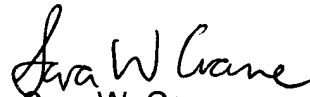
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to S. Crane, whose telephone number is (703) 308-4894.

The fax phone number for this Group is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist, whose telephone number is (703) 308-0956.


Sara W. Crane
Primary Examiner
Art Unit 2811